

CLAIMS

What is claimed is:

1. A pneumatic tire comprising a reinforcing carcass ply and opposing bead portions, the carcass ply comprising one or more cords wound continuously between a first end and a second end, wherein the first end of the carcass ply is located in one of the opposing bead portions, and in the one of the opposing bead portions, the carcass ply cords are interwoven among a plurality of circumferentially oriented bead wires.
2. The tire of claim 1 wherein the carcass ply cords are interwoven such that the first end of the carcass ply follows a zigzag path.
3. The tire of claim 1 wherein the circumferentially oriented bead wires form at least two radially extending columns of bead wires.
4. The tire of claim 3 wherein the bead wires in one radially extending column are radially offset from the bead wires in the adjacent radially extending column.
5. The tire of claim 3 wherein the bead wires in one radially extending column axially overlap the bead wires in the adjacent column.
6. The tire of claim 5 wherein the overlap distance x of the bead wires is 5 to 100% of the bead wire diameter d_B .
7. The tire of claim 3 wherein the bead wires in each column are spaced by a distance z equivalent to $z \geq 2d_C + 0.5d_B$ wherein d_C is the diameter of the carcass ply cords and d_B is the diameter of the bead wires.
8. The tire of claim 1 wherein the first end of the carcass ply is radially inward of the bead wires.
9. The tire of claim 1, the tire further comprising a second carcass ply, the second carcass ply having a first end and a second end, the first end being located in the one of

the opposing bead portions and being interwoven among the plurality of circumferentially oriented bead wires.

10. The tire of claim 9 wherein in the region of the radially inward first ends of the first and second carcass ply, the carcass plies follow opposing zig-zag paths, encompassing bead wires between the carcass plies.

11. The tire of claim 1 wherein the plurality of circumferentially oriented bead wires form at least three radially extending columns of bead wires.

12. The tire of claim 11 wherein the second radially extending column of bead wires is radially offset from the wires in the first and third radially extending columns of bead wires.

13. The tire of claim 11 wherein the bead wires of the third radially extending column are axially and radially aligned.

14. The tire of claim 1 wherein the circumferentially oriented bead wires have either a monofilament or bunched cord construction.

15. The tire of claim 1 wherein the reinforcing elements of the carcass ply are selected from the group consisting of polyester, nylon, fiberglass, aramid, steel, and carbon fiber.

16. A pneumatic tire comprising a reinforcing carcass ply and opposing bead portions, the carcass ply comprising one or more cords wound continuously between the opposing bead portions forming ends of the ply in each bead portion, wherein the ply ends are interwoven in a zigzag path among a plurality of bead wires.

17. The tire of claim 16 wherein the zigzag path of the ply ends changes direction at least four times as the ply end is interwoven among the bead wires.